

WHAT IS CLAIMED IS:

1. A water softener system comprising:

a hard water flow pipe through which hard water flows;

a modular water softener assembly comprising an elongated tube having a first end, a second end, a length extending therebetween, and a predetermined inner volume for storing an amount of water softening particles, said water softener assembly further comprising a first end cap coupled to said tube at said first end having a first port in flow communication with said hard water flow pipe and a second port in flow communication with an outlet pipe through which soft water flows, said water softener assembly supported by said hard water flow pipe and said outlet pipe; and

a regeneration tank in flow communication with said water softener assembly, said regeneration tank containing a regenerate for regenerating said water softening particles.

2. A system in accordance with Claim 1 wherein said water softener assembly system further comprises a riser pipe extending longitudinally within said water softener tube and comprising a first distributor end adjacent said first tube end having a first distributor, and a second distributor end adjacent said second tube end having a second distributor, said first and second distributors are flow reversible, said first distributor is in flow communication with said riser pipe, said tube first port, said tube second port, and said predetermined inner volume, said second distributor is in flow communication with said riser pipe and said predetermined inner volume.

3. A system in accordance with Claim 1 wherein said water softener system further comprises a water softening capacity, said water softening capacity equals a volumetric flow rate at which said water softener assembly having a predetermined inner volume can effectively convert hard water into soft water.

4. A system in accordance with Claim 1 wherein said regeneration tank comprises a first end coupled to said tube second end such that said regeneration tank is supported by said water softener assembly.

5. A system in accordance with Claim 1 wherein said water softening particles comprise water softening mineral beads forming a water softening mineral bed.

6. A system in accordance with Claim 1 wherein said water softening particles comprise water softening resin beads forming a water softening resin bed.

7. A system in accordance with Claim 1 wherein said tube predetermined inner volume is based on a desired water softening capacity from said water softener system.

8. A system in accordance with Claim 7 wherein said desired water softening capacity can be increased by increasing said tube length such that said predetermined inner volume and said amount of water softening particles are increased.

9. A system in accordance with Claim 7 wherein said desired water softening capacity ranges between approximately a 2,000 grain capacity and approximately a 9,000 grain capacity.

10. A system in accordance with Claim 9 wherein said desired water softening capacity ranges between approximately a 2,500 grain capacity and approximately a 6,000 grain capacity.

11. A system in accordance with Claim 10 wherein said desired water softening capacity is approximately a 3,000 grain capacity.

12. A water softener system comprising:

a hard water flow pipe through which hard water flows;

a modular water softener assembly comprising an elongated tube having a first end, a second end, a length extending therebetween, and a predetermined inner volume for storing an amount of water softening particles, said water softener assembly further comprising a first end cap coupled to said tube at said first end having a first port in flow communication with said hard water flow pipe and a second port in flow communication with an outlet pipe through which soft water flows, said water softener assembly supported by said hard water flow pipe and said outlet pipe;

a water softening capacity of about a 3,000 grain capacity; and

a regeneration tank in flow communication with said water softener assembly, said regeneration tank containing a regenerate for regenerating said water softening particles.

13. A system in accordance with Claim 12 wherein said tube length is about 18 inches.

14. A system in accordance with Claim 12 wherein said regeneration tank comprises a first end coupled to said tube second end such that said regeneration tank is supported by said water softener assembly.

15 A hot-side water softener system comprising:

a hard water flow pipe through which hard water flows;

a water heater comprising a tank for holding a quantity of water, a cold water inlet pipe in flow communication with said tank, a hot water outlet pipe extending in communication with said tank, and a burner configured to heat said water held in said tank;

a modular water softener assembly comprising an elongated tube having a first end, a second end, a length extending therebetween, and a predetermined inner volume for storing an amount of water softening particles, said water softener assembly further comprising a first end cap coupled to said tube at said

first end having a first port in flow communication with said hard water flow pipe and a second port through which soft water flows in flow communication with said water heater cold water inlet pipe; and

a regeneration tank in flow communication with said water softener assembly, said regeneration tank containing a regenerate for regenerating said water softening particles.

16. A system in accordance with Claim 15 wherein said regeneration tank comprises a first end coupled to said tube second end such that said regeneration tank is supported by said water softener assembly.

17. A system in accordance with Claim 16 wherein said water softener assembly is supported by said hard water flow pipe and said water heater cold water inlet pipe.

18. A system in accordance with Claim 16 wherein said water softener assembly is configured to be supported by said water heater.

19. A system in accordance with Claim 15 wherein said water softener system converts hard water supplied by said hard water flow pipe into soft water by passing hard water through said water softening particles within said tube, soft water supplied to said water heater through said cold water inlet pipe.

20. A system in accordance with Claim 19 wherein said water softening particles comprise water softening mineral beads forming a water softening mineral bed.

21. A system in accordance with Claim 19 wherein said water softening particles comprise water softening resin beads forming a water softening resin bed.

22. A system in accordance with Claim 15 wherein said water softener system further comprises a water softening capacity, said water softening capacity

equals a volumetric flow rate at which said water softener assembly having a predetermined inner volume can effectively convert hard water into soft water.

23. A system in accordance with Claim 15 wherein said tube predetermined inner volume is based on a desired water softening capacity from said water softener system.

24. A system in accordance with Claim 23 wherein said desired water softening capacity can be increased by increasing said tube length such that said predetermined inner volume and said amount of water softening particles are increased.

25. A system in accordance with Claim 23 wherein said desired water softening capacity ranges between approximately a 2,000 grain capacity and approximately a 9,000 grain capacity.

26. A system in accordance with Claim 25 wherein said desired water softening capacity ranges between approximately a 2,500 grain capacity and approximately a 6,000 grain capacity.

27. A system in accordance with Claim 26 wherein said desired water softening capacity is approximately a 3,000 grain capacity.

28. A hot-side water softener system comprising:

a hard water flow pipe through which hard water flows;

a water heater comprising a tank for holding a quantity of water, a cold water inlet pipe in flow communication with said tank, a hot water outlet pipe extending in communication with said tank, and a burner configured to heat said water held in said tank;

a modular water softener assembly comprising an elongated tube having a first end, a second end, a length extending therebetween, and a predetermined inner volume for storing an amount of water softening particles, said

water softener assembly further comprising a first end cap coupled to said tube at said first end having a first port in flow communication with said hard water flow pipe and a second port through which soft water flows in flow communication with said water heater cold water inlet pipe, said water softener assembly is supported by at least one of said hard water flow pipe, said water heater cold water inlet pipe, and said water heater;

a water softening capacity of about a 3,000 grain capacity; and

a regeneration tank in flow communication with said water softener assembly, said regeneration tank containing a regenerate for regenerating said water softening particles.

29. A system in accordance with Claim 28 wherein said tube length is about 18 inches.

30. A system in accordance with Claim 28 wherein said regeneration tank comprises a first end coupled to said tube second end such that said regeneration tank is supported by said water softener assembly.

31. A method for installing a modular water softener assembly between and supported by a hard water flow pipe and an outlet pipe, the water softener assembly including an elongated tube having a first end, a second end, a length extending therebetween, and a predetermined inner volume for storing an amount of water softening particles, the water softening assembly further including a first end cap coupled to the tube at the first end having a first port and a second port, said method comprising:

providing the hard water flow pipe through which hard water flows;

providing the outlet pipe through which soft water flows;

coupling the first port to the hard water flow pipe such that the first port is in flow communication with the hard water flow pipe; and

coupling the second port to the outlet pipe such that the second port is in flow communication with the outlet pipe.

32. A method in accordance with Claim 31 wherein installing the water softener assembly further comprises installing a water softener assembly having a predetermined inner volume that is based on a desired water softening capacity from said water softener assembly.

33. A method in accordance with Claim 32 wherein installing the water softener assembly further comprises installing a water softener assembly configured to allow for an increase in the desired water softening capacity by increasing the tube length such that the predetermined inner volume and the amount of water softening particles are increased.

34. A method in accordance with Claim 33 wherein installing the water softener assembly further comprises installing a water softener assembly having a desired water softening capacity of about 3,000 grains.